USDA Forest Service 2005

Natural Inquirer

Special Report!

Maintaining The Status Grow

Special Limited Edition Report
Maintaining the Status Grow: Describing the Forests of Fifty-five Countries Around the World
Winter 2005

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Glossary

economic (e ko **nom** ik): Having to do with the management of money in a home, business, or government.

natural resource (**na** cha rôl - re sôrs): A supply of something in nature that takes care of a human need, such as oil.

coniferous (kä **nif** ür us): Having cones.

broadleaved (**brôd** levd): Having flat broad leaves.

deciduous (de **sij** oo us): Shedding its leaves every year; not evergreen.

conserve (kän **sürv**): To avoid wasteful or destructive use of something.

management (**man** ij ment): The act of having charge of or directing the work of.

habitat (**hab** uh tat): Environment where a plant or animal naturally grows and lives.

erosion (e **ro** zhen): The process or state of wearing or washing away.

sequestration (se kwes **tra** shun): The act of holding within or hiding.

variable (**ver** e uh bul): Thing that can vary in number or amount.

survey (**sür** va) A method used to ask questions to collect information.

public (**pub** lik): All citizens in a country.

indigenous (in **dij** uh nus): Living or growing naturally in a place; native.

species (**spe** sez): Groups of organisms that resemble one another in appearance, behavior, chemical processes, and genetic structure.

Pronunciation Guide

a	as in ape
ä	as in car
e	as in me
i	as in ice
o	as in go
ô	as in for
u	as in use
ü	as in fur
oo	as in tool
ng	as in sing

Welcome to the *Natural Inquirer* Special Report!

Maintaining The Status Grow

Describing the Forests of Fifty-five Countries Around the World

This special report was written from research sponsored by the United Nations. The United Nations, or UN, is a world-wide organization of nations. You can learn more about the United Nations by visiting www.un.org.

The purposes of the UN are to:

1. Maintain international security
2. Develop friendly relations among nations
3. Help to solve international cultural and humanitarian (**hu** man uh ter e un) problems
4. Promote respect for human rights
5. Provide funds for special programs
6. Help nations work together to achieve these purposes

As you read the report, you will learn:

1. Some of the benefits provided by forests
2. Which countries are included in the report and where they are located
3. What information was collected about the forests
4. What was discovered about the forests
5. Why this information is important

The UN also includes a family of organizations. These organizations have different jobs to do. Two of the organizations worked together to learn about forests across much of the world. This report was created from the research done by those two organizations. The report includes information about forests in 55 countries.

Meet the United Nations!

The United Nations Economic Commission for Europe: This commission was established in 1947 (How old is the Commission?). Its goal is to encourage *economic* cooperation among its 55 member nations. One of the ways it does this is by collecting information and sharing it. Because *natural resources* have economic value, forests are a topic of concern for this commission.

The Food and Agriculture Organization of the United Nations: This organization leads international efforts to combat hunger. Forests, because they contribute to environmental quality, are of concern to this organization. Environmental quality is directly related to a country's ability to provide food for its people. This organization helps countries to *conserve* and use their forests in a way that helps people today, but ensures that the forests will continue to be healthy and useful to future generations.

Thinking About Science

One of the jobs of scientists is to take information and summarize it. When information is summarized, detail is lost but the big picture is easier to see. In this report, the goal was to summarize information about two kinds of forests in 55 countries around the world. The scientists preparing this report asked scientists from each of these countries to provide information about their country's forests.

The scientists found that for some of the information, different countries collected the same information. This made the summaries easier to prepare. For example, scientists from all countries used the same definition of what a forest is. When each country provided the total number of hectares of forests, the scientists knew that their summary would be accurate. In other cases, scientists from different countries did not collect the same kind of information. Sometimes they did not collect needed information at all. This made some of the summaries less accurate.

When scientists collect and summarize information from different sources, they must pay careful attention to whether the information they summarize represents the same thing. If it does not, scientists must do the best that they can to prepare an accurate summary. Although this is a challenge, it is better to be less accurate than not to have any information at all. Above all, scientists must be honest about the accuracy of their reporting.

Thinking About the Environment

To make the best decisions about natural resources, people need to have good information about them. Because we now live in a global community, we need to understand the big picture about our global natural resources. In this report, the scientists wanted to understand the status of boreal and temperate forests around the world.

Figure 1. Boreal forest

Boreal forests are Earth's northernmost forests, and are mostly made up of evergreen *coniferous* trees. Examples include spruce, fir, cedar, and hemlock (figure 1). Boreal forests may also contain a few *broadleaved deciduous* trees, such as aspen, birch, and willow. Temperate forests are made up of mostly deciduous trees that grow in moderate climates with a change of seasons (figure 2). Temperate forests grow where the summers are long and the winters are cold but not severe. Examples of trees growing in temperate forests are oak, hickory, maple, poplar, sycamore, and beech. Think about the environment where you live. Are you close to a forest? If so, what kind of forest is it? If you do not know, do some research on the Web or in the library to find out.

Figure 2. Temperate forest

Introduction

To make wise decisions about anything, people need to have the best information possible. Because forests provide many benefits to people, people need to make wise decisions about the *management* of their forests (figure 3). We live in a global environment, and people have realized that they must work together to keep their forests healthy. To work together when managing forests, people need information about all of the forests. The United Nations decided to help by collecting information about the world's boreal and temperate forests (figures 4 & 5).

Variable	Description
Timber supply	Forests provide timber that is used in wood products, such as baseball bats, lumber for building, and furniture. Look around you. How many wood products do you see? What are they?
Food	Forests provide food products, such as nuts, berries, and syrup. Forests contain many edible plant species that grow on the forest floor, including mushrooms.
Medicines	About 80 percent of the world relies on plants or plant extracts for medicines. Many of these plants are growing in forests.
Other products	Forests provide things like rubber, dyes, chewing gum, ointments, perfumes, food flavoring extracts, adhesives, turpentine, charcoal, and pine oil.
Wildlife *habitat*	Forests provide homes for animals that live in the wild, examples include birds, mammals, reptiles, and amphibians.
Air quality	Forests act as filters and help to keep our air clean.
Water quality & *erosion* control	Forests help to hold the soil in place. This keeps pollutants and soil from being washed into streams and rivers.
Carbon *sequestration*	By absorbing carbon dioxide, forests help to keep carbon on Earth. Although carbon dioxide is contained in the atmosphere, deep in Earth, and in all living things, human activities have upset the carbon balance. Too much carbon in the atmosphere leads to global climate change.
Plant & animal diversity	Forests provide natural homes for a wide variety of plants and animals. When plants and animals are left undisturbed, many different types of plants and animals can survive and reproduce.

Figure 3. Some benefits provided by forests.

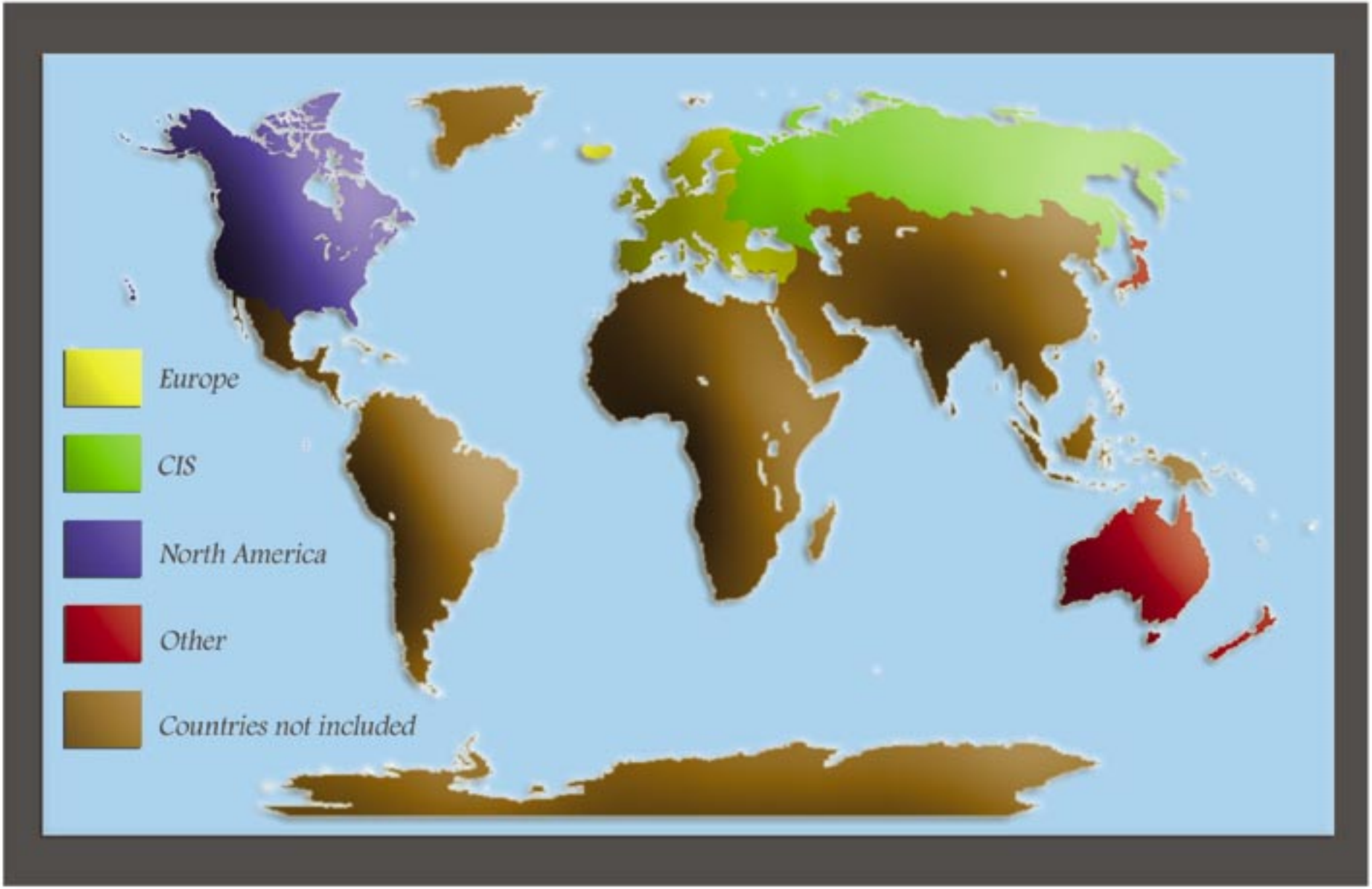

Figure 4. The countries with boreal and temperate forests that provided information for this report.

Figure 5. Countries included in the study.

Reflection Section

What was the problem the scientists were trying to solve?

Do you think that it is a good idea to share information with other countries about your own country's forests?
Why or why not?

The scientists developed a list of *variables* that they felt describes Earth's boreal and temperate forests (figure 6). They had to select information that would be available, and it had to be useful information. To collect the information, the scientists created a survey. They sent the survey to scientists in 55 countries that contain boreal or temperate forests.

After receiving the completed surveys, the scientists had to make sure that the information on each variable represented the same thing. For example, did each country define forests the same way? They also had to consider that they could not get all of the information that they wanted. For example, some countries collected information about the number of people using forests for recreation. Other countries did not collect that information. Finally, they had to calculate how much carbon is being sequestered (or held) by forests using a mathematical equation. Half of the dry matter of a tree is made up of carbon. The scientists made estimates of the amount of dry matter in the forests to determine how much carbon those forests contain.

Variable	Description
Forest land	The amount of boreal and temperate forest land in number of hectares.
Forest land in *public* ownership	The amount of boreal and temperate forest land in number of hectares managed by the government on behalf of all of the citizens.
Forest land in private ownership	The amount of boreal and temperate forest land in number of hectares owned by private citizens, business and industry, and organizations.
Forest land owned by *indigenous* peoples	The amount of boreal and temperate forest land in number of hectares owned by peoples who are native to that area.
Forest land available for wood supply	The amount of boreal and temperate forest land in number of hectares that can be cut down for making wood products.
Forest land not available for wood supply	The amount of boreal and temperate forest land in number of hectares that cannot be cut down for making wood products.
Forest land not available for wood supply and undisturbed by humans	The amount of boreal and temperate forest land in number of hectares that cannot be cut down for making wood products and that has not been disturbed by humans in the past.
Carbon storage by forests	The amount of carbon that is contained in the trees and plants growing in boreal or temperate forests.
Damage to forests	A list of main threats to the health of boreal and temperate forests, such as insects, fires, and disease.
Recreational use	A list of the kinds of uses made of boreal and temperate forests for fun and recreation such as hiking, canoeing, camping, and bicycling.

Figure 6. Examples of variables used to collect information about boreal and temperate forests.

Reflection Section

Look at the list of variables given in figure 6. Name one other variable that you would like to know about Earth's boreal and temperate forests. You might want to review the list of forest benefits in figure 3 to give you some ideas.

Think about your answer to the reflection question above. If you were the scientist trying to collect information about your variable, exactly what would you measure to get your information?

Findings

Boreal and temperate forest land covered almost 1.7 billion hectares (figure 7). (To find out how many acres this is, multiply 1.7 billion by 2.47). This was just a little less than half of the total land area in the countries. Almost half of all forest land was identified as mostly coniferous. The other portion was either mostly broadleaved or mixed broadleaved and coniferous. About two-thirds of all forest land was available for wood supply. (About what percentage was not available for wood supply? Subtract 66 from 100 to find the percentage.)

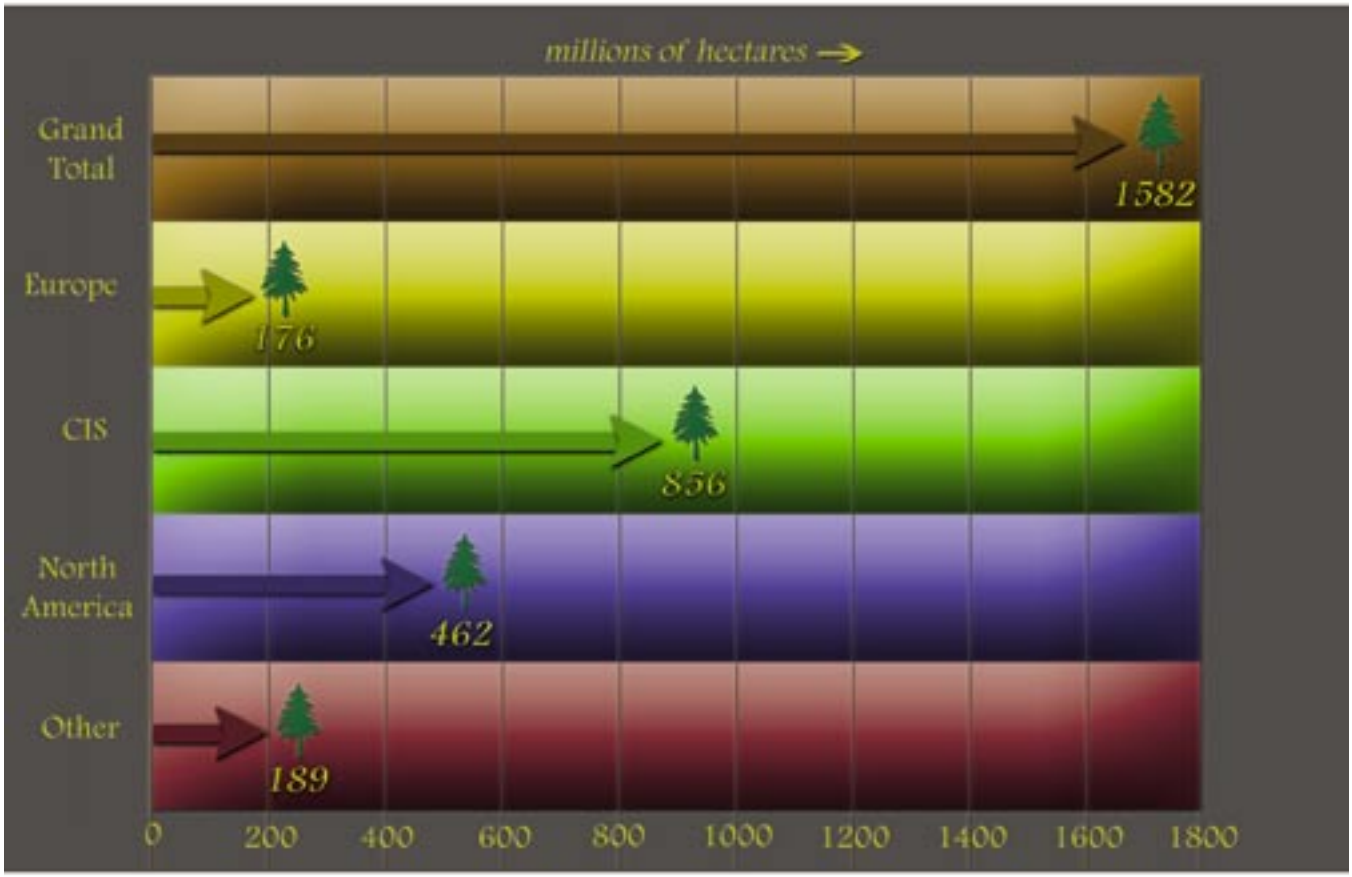

Figure 7. Area of boreal and temperate forest in the countries surveyed.

Across all of the countries, there were differences in the percentages of forest land ownership. Figure 8 shows the percentages of land ownership. It is interesting to note that in the CIS countries, 100 percent of forest land is not pubicly owned. (Compare this with the overall averages shown in figure 8.) In all of the countries, public land is held in large tracts. Privately owned lands are held by many different owners. These owners usually own small tracts of land.

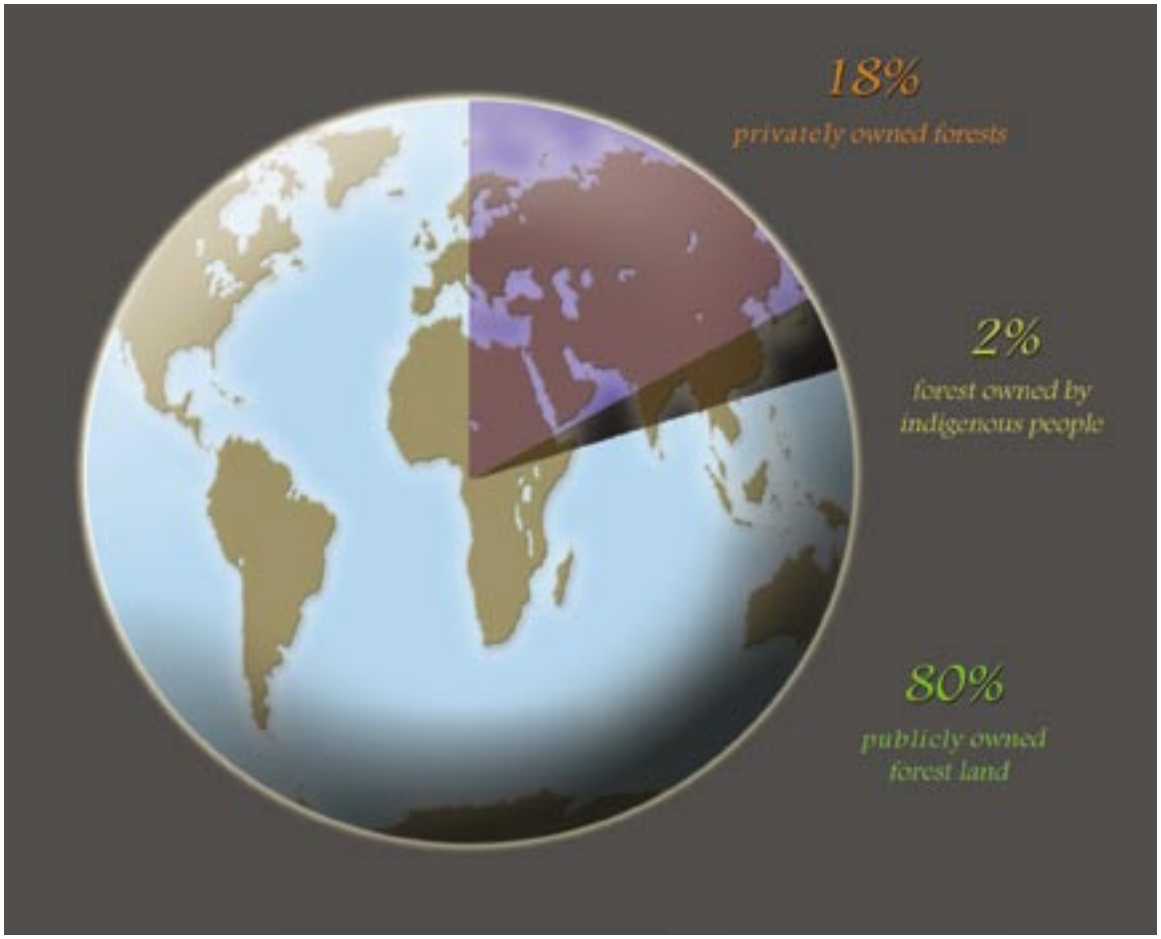

Figure 8. Ownership categories and percentages for boreal and temperate forest lands.

Of the forest land that is not available for wood supply and is undisturbed by man, about 87 percent is found in just four countries. These countries are the Russian Federation, Canada, the United States, and Australia. The scientists noted that this figure must be considered with caution. This is because different countries have different definitions for this type of land.

Figure 9. Fire is a major source of damage to boreal and temperate forests.

Of the total amount of carbon being stored in plants and forests all over Earth, the boreal and temperate forests in this report store about 14 percent. Of this amount, 47 percent is stored in the CIS countries, 34 percent in North America, 10 percent in Europe, and 9 percent in the other countries. It was estimated that boreal and temperate forests increase the amount of carbon they hold by one percent every year. This one percent is important. Without it, the amount of carbon dioxide in the atmosphere would be increasing 28 percent more every year than it is currently.

Few countries had collected information on damage to their forests. The scientists were not able to develop estimates of the number of hectares damaged. However, they determined that the most important causes of damage are fire and insects (figure 9). Canada reported a large number of hectares damaged by fire and insects. Other threats included grazing by animals, which was especially damaging to European forests in Austria, Belgium, Bulgaria, Denmark, and Poland.

The scientists were not able to collect specific numbers regarding the use of forests for recreation. All countries reported, however, that recreational use is increasing. People especially liked to picnic, hike, camp, horseback ride, and go mountain biking in forests (figure 10). The scientists also found that in most countries, there was an increase in the use of forests for learning about history, culture, and science. Forests were also being used more often for spiritual purposes.

Figure 10. Recreational use of forests is increasing.

Reflection Section

Look at the last sentence in the first paragraph under “Findings.” What does 66 represent?

Think about land ownership in your own country. Based on your own experience, do you agree with the finding that most of the privately-owned land is held in small tracts? Why or why not?

Think about the amount of forest land that is undisturbed by man and is not available for wood supply. Almost 90 percent is found in just four countries. Look at figures 4 and 5. What are some possible explanations for this number?

Would you say that keeping boreal and temperate forests is an important way to combat global climate change? Why or why not?

The scientists reported an increase in the recreational use of forests. From your own experience, do you agree with this? Why or why not?

Implications

This report is a first step to better understanding Earth's boreal and temperate forests. With this information, the United Nations can help countries to understand the benefits their forests provide. People in these countries can now compare the status and condition of their forests with other countries. This report will help them to learn from each other. It will help countries to conserve their forests as a part of the larger global environment.

Reflection Section

In everyone's life, there is a time when problems are easier to solve by looking at the big picture. The big picture often involves time as well as space. Think of a time in your life when you were able to solve a problem by looking at the big picture. Hold a class discussion or a discussion with at least one other person and share your experience.

The scientists in this study described the forests growing in 55 countries. For the most part, these forests are either boreal or temperate forests. In the section of this article entitled "Thinking About the Environment," you read which species of trees make up each kind of forest. In this FACTivity, you will determine whether the closest forest to your school or home is a temperate or boreal forest. You will not determine this based on where you live, but on the type of trees growing near you.

To make this determination, follow these steps:

1. As a homework assignment or during class, each student will collect at least 10 different leaves from trees near their school or home. Students should attempt to collect a variety of leaves, including leaves from evergreen trees (including pine needles).

2. During class, students will eliminate duplicate leaves, ending up with a variety of unique leaves that include broadleaved and leaves from coniferous trees.

3. Divide the leaves among the students. Do leaf rubbings to preserve the shape of each leaf.

4. Identify the leaves using a tree identification book.

5. Collect data about local climate such as amount of rainfall, temperatures, and seasons as well as geographic location (for example, latitude).

6. Using the information gathered about climate and the forest near your school or home; make a determination about whether the forest near your school or home is boreal or temperate.

Note to Educators:

Possible Answers to Reflection Questions

Introduction Reflection Section Answers

What was the problem the scientists were trying to solve?

- There was no source for information about all of the world's boreal and temperate forests. This information is necessary to help people make the best decisions possible about how the forests are managed and conserved.

Do you think that it is a good idea to share information with other countries about your own country's forests? Why or why not?

- This question must be answered by students using their own reasoning. The important thing is not whether they answer yes or no, but whether they can defend their answer using appropriate logic and reasonable arguments.

Method Reflection Section Answers

Look at the list of variables given in figure 6. Name one other variable that you would like to know about Earth's boreal and temperate forests. You might want to review the list of forest benefits in figure 3 to give you some ideas.

- This is an individual question. The educator should encourage students to be creative and imaginative, yet to consider variables that might provide useful information.

Think about your answer to the reflection question above. If you were the scientist trying to collect information about your variable, exactly what would you measure to get your information? For example, let's say that your variable was "wildlife." You might suggest identifying a species of mammal living in the forest. Then, you would ask the scientists in each country to count how many of that particular mammal species was living in their country.

- Each student should be encouraged to come up with their own way of identifying and measuring their variable.

Findings Reflection Section Answers

Look at the last sentence in the first paragraph under "Findings." What does 66 represent?

- Sixty-six represents the percentage of forest land available for wood supply.

Think about land ownership in your own country. Based on your own experience, do you agree with the finding that most of the privately-owned land is held in small tracts? Why or why not?

- This is a personal question and must be answered individually. It is important for students to be able to justify their answer using concrete observations.

Think about the amount of forest land that is undisturbed by man and is not available for wood supply. Almost 90 percent is found in just four countries. Look at figures 4 and 5. What are some possible explanations for this number?

- The four countries make up most of the land surveyed in this research. It seems reasonable that most of the undisturbed land would be found in these four countries.

Would you say that keeping boreal and temperate forests is an important way to combat global climate change? Why or why not?

- Yes, because there would be over 28 percent more carbon dioxide going into the atmosphere every year without these forests.

The scientists reported an increase in the recreational use of forests. From your own experience, do you agree with this? Why or why not?

- This is a personal question and should be used to stimulate a classroom discussion about each student's recreational use of forests. Different kinds of activities can be identified, and students can discuss using the forest to learn about history, culture, and science. Students should back up their statements with concrete observations.

Implications Reflection Section Answers

In everyone's life, there is a time when problems are easier to solve by looking at the big picture. The big picture often involves time as well as space. Think of a time in your life when you were able to solve a problem by looking at the big picture. Hold a class discussion or a discussion with at least one other person and share your experience.

- As the teacher, you may need to get this discussion started by sharing one of your own experiences.

Natural Inquirer Lesson Plan:

United Nations Special Report

Subjects covered: science, reading, writing, and art

Recommended Web Site: http://earthobservatory.nasa.gov/Laboratory/Biome/biotemperate.html

Objectives:

1. Students will be able to distinguish between temperate deciduous forests and boreal forests.
2. Students will be able to synthesize and apply information learned about these forests to create murals of each type of forest.
3. Students will be able to identify different types of plants and animals that live in each type of forest biome.

Estimated Time: 1 week

Materials:

Day 1

- UN Special edition NI
- Poster paper
- Markers

Day 2-3

- UN Special edition NI
- Computers
- Books on boreal and deciduous forests
- Objects from nature (leaves, twigs, etc…)
- Magazines and newspapers
- Scissors

Natural Inquirer Lesson Plan Continued: United Nations Special Report

Day 4-5

- UN Special edition NI
- Poster paper
- Objects from nature (leaves, twigs, etc…)
- Mural paper
- Paint
- Paint brushes
- Markers

Procedure:

Day 1

1. Using reading buddies, have students read "Thinking About the Environment" section.

2. After reading the section, have students create KWL charts listing what they know about both boreal and temperate forests and what they would like to know. For more information about KWL charts, visit http://curry.edschool.virginia.edu/go/readquest/strat/kwl.html or http://www.nps.gov/efmo/parks/kwlchart.htm

a. "K" stands for what you know

b. "W" stands for what you want to know

c. "H" stands for how you want to learn it

d. "L" stands for what you have learned

3. Create a chart of the K, W, and H sections and post it on the wall leaving the L part of the chart to be filled in at the end of the lesson.

4. Using students' questions about what they want to know about boreal and temperate forests, have students research information on boreal and temperate forests. Split students up into research teams.

5. Each team should spend some time researching using the Internet and the library.

Day 2 & 3

6. Students should research information regarding average temperatures, amount of rainfall, types of plants and animals, locations of these forests, and other topics.

Natural Inquirer Lesson Plan Continued:

United Nations Special Report

7. Students should also look for pictures of animals and plants that they will be able to look at to help them create a mural.

8. Students can also look outside to gather natural objects such as twigs and leaves to include on the mural.

Day 4 & 5

9. Students should start to compile information on each area onto small information posters that will be hung next to the mural that students will create.

10. Students should include 2-3 facts from the *Natural Inquirer* article on the mural or information poster.

11. Some students can begin working on mural. Each student should contribute something to the mural.

Assessment:

The murals can be hung in the hallway with the informational posters next to them. Each group of students should examine the other mural and information provided by the group. Writing a paragraph on the similarities and differences of the deciduous forest and the boreal forest can assess students' knowledge about these two types of forests. Students can be even more creative and write poems or songs that portray the similarities or differences. Finally, have students complete the "L" column in the KWL chart to show what they have learned.

Modifications:

For students that have difficulty reading, they can be paired with a reading buddy or they can use the computer to help with comprehension strategies. Students can have guided reading assignments and make use of graphic organizers. For advanced students, they can do more in-depth research on a particular plant or animal in the deciduous or boreal forest and give a special presentation to the class on this plant or animal.

Note: Teachers, please take pictures of murals and send them to us and we will post them to the web site.

What is the Forest Service?

The USDA Forest Service is part of the federal government. It is made up of thousands of people who care for the Nation's forest land. The Forest Service manages over 150 national forests and 20 national grasslands. National forests are similar in some ways to national parks. Both National forests and national parks provide clean water, homes for animals that live in the wild, and places for people to do fun things in the outdoors. National forests also provide resources for people to use, such as trees for lumber, minerals, and plants used for medicines. Some people in the Forest Service are scientists. Forest Service scientists work to solve problems and provide new information about natural resources so that we can make sure our natural environment is healthy, now and into the future.

Visit these Web sites for more information:

The Natural Inquirer: www.naturalinquirer.usda.gov

United Nations Economic Commission for Europe:

http://www.unece.org/about.htm

Food and Agriculture Organization of the United Nations:

http://fao.org/UNFAO/about/index_en.html

Forest Service

United States Department of Agriculture

USDA

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New York and Geneva: United Nations.